larger than in autumn, the weight is nearly twice as great. Their physiological activity culminates with the maturing of the ova and the labor of depositing it; this effected, they are worn out and in a very short time, die.

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THE EVOLUTION OF FORMS FROM THE CLINTON TO THE NIAGARA GROUP.

BY EUGENE N. S. RINGUEBERG.

WHILE collecting Niagara and Clinton fossils in the village of Gasport during the fall of 1881, I was struck by the peculiarity of texture and character of the fossils contained in the upper band of limestone; which is there found superimposed upon the series forming the upper portion of the Clinton group proper, and I at once recognized a similarity between its fauna and structure, to an analogous layer which I had previously noticed in the western portion of the town of Lockport, but had failed to find at several other points of outcrop.

At the place where it was first noticed, however, its character, both in regard to the fossils contained, which there are generally rare and fragmentary, and the general appearance of the rock, is not so pronounced in distinction from the underlying strata as at Gasport.

This layer is not continuous, but apparently occurs in confined areas. Thus it is found at Gasport and again in the western portion of the town of Lockport. But in the city, about two miles east from the latter point, and on the same line of outcrop, whose general direction is from east to west, it is entirely wanting, as I have ascertained by a careful examination of both natural and artificial exposures at the line of juncture between the Niagara shale and Clinton limestone.

It is extremely variable in thickness, but I should judge its greatest development to be in the neighborhood of two feet. This is merely to be taken as an estimate, as I have not been able thus far to take the proper means of obtaining accurate measurements.

The upper surface is extremely irregular and undulating; having the appearance of being drifted together. This is also corroborated by the position of many of the fossils, which seem to have been swept together by eddies, which at the same time were

charged with sedimentary matter by which they were entombed as we now find them.

Thus immense numbers of the cephalic and caudal shields of *Illænus barriensis* will be found in the space of perhaps ten or fifteen inches, and outside of this accumulation there will not be any except a stray one or so.

In one vertical section of the stone in my collection, two inches in diameter, the fracture shows thirteen shields of this trilobite crowded one above the other. It also does not seem to have any very regular lines of stratification. At Gasport the limestone has a light bluish tint, and breaks, when comparatively free from fossils, with a clean flinty fracture, and is very hard, fine grained and compact. The majority of the shells have the interior filled with crystallized calcite, and some of the larger cephalopods are lined with crystals of the same. From all information obtainable, it seems that this layer has always been associated with the Clinton group. Its fossils, however, prove that it is more closely allied to the Niagara.

The most common forms are *Atrypa nodostriata* and *Meristina nitida*, both of which are Niagara forms. After these we may cite *Spirifera radiata*, *Lichenalia concentrica* and *Illænus barriensis;* which are common to both. The first of these reaches its perfection in the Clinton, and is found in a minor degree in the subsequent shales of the Niagara, while the two last are but sparingly found in the Clinton, and are found in the greatest numbers at the opening of the Niagara series.

But the most striking feature of this limestone—for which I propose the name of the *Niagara Transition Group*—is the abundance and perfection of the Cephalopoda, which in all other strata of the Niagara period in Western New York are quite rare, with the exception of *Orthoceras annulatum*, which is found in moderate numbers in the Niagara shale and also is the most common of the Clinton forms. In this respect as in the identity of a number of species, we find a strong analogy to the limestones representing the Niagara group in the Western States. In it we find *Cyrtoceras hercules*, *C. brevicorne*, *Trochoceras costatum*, *Trochonema pauper*, *Palæocardia cordiformis*, etc., which will be recognized as western species.

The majority of the species, as will be seen by the following

lists, are Niagara; next in number come those common to both, after which will be found the Clinton and characteristic species:

NIAGARA SPECIES.

Calymene niagarensis,
Bronteus niagarensis,
Orthoceras medullare,
" *alienum*,
Cyrtoceras cancellatum,
" *hercules*,
" *brevicorne*,
Trochoceras costatum,
Trochonema pauper,
Palæocardia cordiformis,
Cypricardinia undulostriata,
Callopora elegantula,
" *laminata*,
Trematopora ostiolata,
Fenestella cribrosa,
Pentamerus interplicata,
Stephanocrinus gemmiformis,
Atrypa nodostriata,
" *rugosa*.
Cœlospira disparilis,
Rhynchonella cuneata,
" *obtusiplicata*,
Spirifera eudora,
" *niagarensis*,
Meristina nitida,
" *oblata*,
" *maria*,
Orthis flabellum,
" *hybrida*,
" *biloba*,
Streptorhynchus subplana,
Strophodonta striata.

SPECIES COMMON TO THE NIAGARA AND CLINTON.

Illænus barriensis,
Orthoceras annulatum,
Modiolopsis subalatus,
Avicula emacerata,
Lichenalia concentrica,
Caryocrinus ornatus,
Spirifera radiata,
Strophomena rhomboidalis,
Meristina intermedia,
Atrypa reticularis,
Rhynchonella neglecta.

CLINTON SPECIES.

Murchisonia subalata,
Athyris congesta,
Orthis lynx.

CHARACTERISTIC SPECIES OF THE NIAGARA TRANSITION GROUP.

Discina solitaria (n. sp.),
Leptæna sericea var. *intermedia* (n. var.).

As will be seen there are three species which have been considered to pass out of existence with the Clinton, that still survive in the stratum under consideration; unless we should also include the Leptæna described below.

Meristina intermedia has been placed in the list of species common to both groups, as the one from the Transition stratum, as well as those from the Clinton, are indistinguishable from specimens found in the Niagara shale; the only perceptible difference being a gradual falling off in size as we advance upwards in the series, and a slight diminution of the average width, so that some from the Niagara approach closely to the typical *M. nitida*, although others will be found that are fully as wide as those from the Clinton.

In all probability *M. nitida* and *M. oblata* are descendants of

M. intermedia; one branch developing in width while the other became narrow and elongate.

Thus far no Meristinæ have been found with a pronounced mesial fold, of which *M. naviformis* of the Clinton, and *M. maria* of the Niagara may be considered as types, although an intermediate form will, I think, be found.

The three specimens of *Stephanocrinus gemmiformis* found, all show a marked angularity of form similar to some young *S. angulatus.*

A Leptæna occurs in this rock that seems to be intermediate between *L. sericea* and *L. transversalis*, which it resembles in the convexity of the dorsal and the concavity of the ventral valves, while in texture, which is punctate and not so strongly striate as in *L. transversalis*, and by its wide lateral alation, it is more closely allied to *L. sericea.* Therefore I propose the name *Leptæna sericea* var. *intermedia*, as it undoubtedly represents the stage through which *L. sericea* passed before developing into what is known as *L. transversalis.*

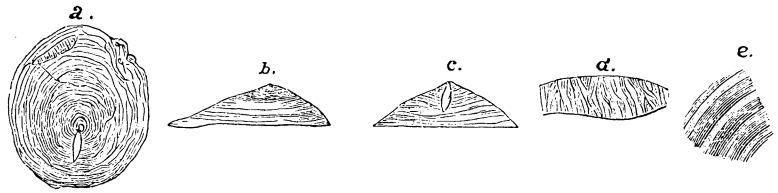
The *Atrypa nodostriata* found here does not have so prominent a mesial fold as the Niagara forms, it being more gradual, and but little more pronounced than is found to be the case in gibbous specimens of *A. reticularis* from the Clinton.

Other species show slight variations from the Niagara types, or perhaps, more properly speaking, the types vary from the transition species.

Thus it will be seen that in many ways this apparently unimportant thin stratum, with its limited areas, that has been overlooked by the hundreds of geologists that have traversed this far-famed geological field, who probably have been lured from greater palæontological wealth by the tempting display of finely weathered-out fossils on the shale banks immediately above, as well as discouraged by the difficulty of wrenching the treasures from its flint-like grasp, plays a very important factor in the connecting chain of palæontological evolution. It binds together in closer unity two formations by its intermediate character, and also by the blending in it of forms before considered characteristic of these two well-defined groups.

Discina solitaria (n. sp.).—Shell oval, ventral valve with prominent apex; slope convex, slightly incurved near the apex on the posterior side; strongly marked by recurved concentric laminæ, of which, near the apex, there are about eight to one-eighth of an inch; these grow more crowded, wider and less recurved as they ap-

proach the margin, where they project from the surface on a plane with the valve and lie one against the other; these lower laminæ, when magnified, present a deeply wrinkled and furrowed appearance; these furrows are irregular, and proceed from the shell, growing fainter at the margin of the laminæ, and are scarcely perceptible unless the laminæ above are broken, apex about two-fifths of the length from the anterior edge; length, seven-eighths inches, width, six-eighths inches; height of apex



Discina solitaria (n. sp.)—*a*, ventral valve, nat. size; *b*, ventral valve, lateral view, nat. size; *c*, ventral valve, anterior view, nat. size; *d*, undulate surface of lamina from near the edge, enlarged; *e*, recurved laminæ from near the aperture, enlarged.

one-fourth inch. Foramen commences at the apex and extends half way down the side; shell barely incurved at this point, laminæ continuing without interruption to the edge of the apex here.

NOTE.—Since the above was written I have succeeded in procuring a young specimen of a Meristina with a mesial fold. It appears to be closely allied to *M. maria*, and it has consequently been placed in the Niagara list until other specimens are found which will determine its relationship more clearly.

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HYPNOTISM IN ANIMALS.[1]

BY D. W. PRENTISS.

Mesmerism, or more properly *hypnotism*, has been recognized under various names in the history of all nations.

The same influences which work the modern phenomena of hypnotism are undoubtedly identified with the manifestations of magic found described in ancient history. The magic of Zoroaster, the wonderful performances of the magi of the East—among the ancient Persians, Hindoos and Egyptians—the spells and incantations of the Grecian and Roman oracles, the methods of divination, the remarkable feats of the snake charmers of India and Egypt, all belong to the same category.

And so also might we include the more recent wonderful manifestations of religious mania which swept Europe in the seventeenth century as an epidemic, known as the "dancing mania," and was literally a national calamity. In our own country it was

[1] Read before the Biological Society of Washington, D. C., March 31, 1882.